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Siemens Corporation
Intellectual Property Department
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EXAMINER	
PATEL, JAYESH A	
ART UNIT	**PAPER NUMBER**
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	**Application No.** 10/681,702	**Applicant(s)** COMANICIU, DORIN
	Examiner Jayesh A. Patel	**Art Unit** 2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 03/15/2007 have been fully considered but they are not persuasive in view of the amendment to Claims 1 and 12

2. Regarding Claim 7 the Examiner does not agree to the arguments with respect to 35 U.S.C 101 as the Claim recites a process of mathematical algorithm without practical limitation. For the purpose of examination the examiner assumes the initial estimates of the motion of an object as in claims 1 and 12.

3. The examiner withdraws the 35 U.S.C 101 rejections for Claims 1-6 and 12-17 in view of the amendments.

4. The examiner still maintains the 35 U.S.C 101 rejections for Claims 7-11.

5. Regarding Claim 1 arguments with respect to 35 U.S.C 102(e), the examiner disagrees. Hazma does not specifically recite the word **"determining the density based fusion estimates"** but does the probability distribution **(density)** on the estimated position **(motion of an object)** and the performance characteristics of the sensor at **(Fig 4,Col 3 Lines 65-67 and Col 4 Lines 1-28)**. Fig 4 shows the probability curves **(density)** of estimated position of the object

(location) for each sensor. Hazma also teaches at **(Col 2 Lines 17-20)** applying one or more statistical operators **(i.e. mean and co-variance etc.)** to derive the intersection of all reports **"to generate a value indicative of the most likely location of the object"** which shows the most significant mode of the claimed invention. Also the meaning of the **"most significant mode"** as recited by the applicant is described as **(Para 0056 and Page 14 Lines 18-20)** of the disclosure as the **"the most probable value of the data"**, e.g. the most significant mode. Therefore Hazma teaches at **(Col 3 Lines 3-6)** the most likely location of the object.

6. Regarding Claim 7 arguments with respect to 35 U.S.C 102(e), the examiner disagrees. Hazma teaches determining a plurality of initial estimates of motion; tracking a mode of a density function across scales given multiple source models, wherein each source model corresponds to a set of initial estimates of a motion in **(Fig 4,Col 3 Lines 65-67 and Col 4 Lines 1-28)**. Also the applicant discloses the word scales as a curve **(Para 0059 and Page 16 Lines 9-12)**. Therefore Hazma also discloses curves **(scales)** as the claimed invention in Fig 4.

7. Regarding Claim 12, the applicant is claiming a program embodying a method of claim 1 as such see the examiner's response to claim 1 with the arguments.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 7-11 are rejected under 35 U.S.C 101 as the claimed invention is directed to non-statutory subject matter because the claims as recited shows algorithmic or mathematical manipulations (abstract idea) and does not produce any practical application or tangible result.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hazma in view of Cham et al. (US 6314204) hereafter Cham.

8. Regarding Claim 1, Hazma discloses An information fusion method in **(Fig 1 and Col 2 Lines 1-20)** comprising: determining a plurality of initial estimates of motion of an object at **(Col 2 Lines 50-57)** comprising mean and covariance information **(statistical methods at Col 3 Line 4)**, the plurality of initial estimates at **(Col 2 Lines 50-56)**; and determining a density based fusion estimate as a most significant mode of a density function determined from the plurality of initial estimates of motion of an object at **(Col 3 Lines 44-64)** wherein the most significant mode corresponds to a determined motion estimate of the object at **(Col 4 Lines 23-28,Col 5 Lines 22-26)**. In **(Fig 5 Elements 504 and 510)**, 504 is the best curve fit of the data from the sensor **(Col 4 Lines 57-59)**. Hazma is silent about the word density but the probability distribution curves as shown in Fig 4 are in fact density curves and hence density based fusion is performed. Although Hazma does not specifically recite the words mean and co-variance but statistical methods would include mean, median, covariance and standard deviation etc. The above facts are made clear by the teachings of Cham.

Cham uses probability density function for tracking targets of interest using statistical methods such as mean and variance in **(Fig 5b and Col 9 Lines 8-13)**. Cham further discloses the **"best modes"** of the probability function may be selected by various methods at **(Col 6 Lines 34-42)**. Cham discloses tracking the motion of the objects by analyzing (statistical) the data at **(Col 1 Lines 18-21)**. Cham further discloses the term **"state"** which is the collection of the data required to completely specify the model for eg.location of each aircraft. The state is used to compute a predicted image in the next video frame, and the recursive **estimation** process is used to refine the state values by comparing the predicted image with the data gathered by the video camera at **(Col 1 Lines 45-56)**. Both Hazma and Cham are analogous art and are from the same field of endeavor, therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Cham for the above stated reasons.

9. Regarding Claim 2, Hazma and Cham discloses the method of claim 1. Hazma further discloses wherein the density function is determined according to a variable-bandwidth kernel density estimate at **(Fig 3,4 and Col 3 Lines 28-37,Col 4 Lines 1-28)**. The weighted averaging technique for aggregating **(Fusion)** uncertainty boundaries and reported locations are used to locate object 30. In figure 4 the elements 401-406 are variable bandwidth **(sub-ranges)**.

10. Regarding Claim 3 Hazma and Cham discloses the method of claim 1. Hazma further discloses comprising determining a covariance **(statistical methods)** of the fusion estimate, wherein the covariance is a convex combination as shown in **(Fig 3)** of covariances of the plurality of initial estimates, each initial estimate having a weight, wherein the weights of the initial estimates are determined according to the most significant mode of the data. The intersection region 82 of the object 30 is determined by the convex **(rounded outward)** combination of estimates from the sensors. This is disclosed at **(Col 3 Lines 44-64)**. Cham also discloses the covariance of the probability density function components at **(Col 8 Lines 15-21)**.

11. Regarding Claim 4, Hazma and Cham discloses the method of claim 1. Cham further discloses wherein the most significant mode is determined by mode tracking across scales at **(Figs 16-18 and Col 14 Lines 14- 35)**, the mode tracking beginning with a unique mode defined at a relatively large scale and tracking that mode toward a relatively smaller scale at **(Col 14 Lines 13-67 and Col 15 Lines 1-7)**. Fig 20 shows the tracking at smaller scale. Hazma also discloses the tracking at a larger scale to a smaller scale at **(Col 3 Lines 34-38).**

12. Regarding Claim 5, Hazma and Cham discloses the method of claim 1. Hazma further discloses wherein determining the plurality of initial estimates comprises determining a window **(Region 82)** bounding the data for motion estimation at **(Fig 3 and Col 3 Line 60)**.

13. Regarding Claim 6, Hazma and Cham disclose the method of claim 5. Cham further discloses a method comprising: determining a matrix of spatial gradients in the data at **(Col 13 Lines 28-39)**; determining a vector of temporal image gradients in the data at **(Col 7 Lines 18-32)**; and determining the covariance information as a matrix proportional to a variance of noise in the data based on the matrix of spatial gradients and the vector of temporal image gradients at **(Col8 Lines 15-28)**.

14. Claim 7 is a method claim with same limitations of Claim 1. See the explanation of Claim 1. Cham further discloses wherein the most significant mode is determined by mode tracking across scales at **(Figs 16-18 and Col 14**

Lines 14- 35), the mode tracking beginning with a unique mode defined at a relatively large scale and tracking that mode toward a relatively smaller scale at **(Col 14 Lines 13-67 and Col 15 Lines 1-7)**. Fig 20 shows the tracking at smaller scale. Hazma also discloses the tracking at a larger scale to a smaller scale at **(Col 3 Lines 34-38).**

15. Claim 8 is a method claim with same limitations of Claim 2. See the explanation of Claim 2.

16. Claim 9 is a method claim with same limitations of Claim 3. See the explanation of Claim 3.

17. Regarding Claim 10, Hazma and Cham discloses the method of Claim 7. Cham further discloses the method of Claim 7, wherein the density function is determined as a sum value of a plurality of Gaussian kernels located at data points in a predetermined neighborhood of data in **(Fig 9, Col 12 Lines 42-50)**.

18. Regarding Claim 11, Hazma and Cham discloses the method of claim 10. Cham further discloses wherein each Gaussian kernel comprises spread information and orientation information at **(Col 17 Lines 36-38)**.

19. Claim 12 is a program tangibly embodying the method of Claim 1; therefore see the explanation of Claim 1. Hazma discloses a system in **(Fig 5 and at Col 1 Lines 6-10)**. Cham also discloses a program for object tracking in **(Fig 2)**.

20. Claim 13 is a program tangibly embodying the method of Claim 2; therefore see the explanation of Claim 2. Hazma discloses a system in **(Fig 5 and at Col 1 Lines 6-10)**. Cham also discloses a program for object tracking in **(Fig 2)**.

21. Claim 14 is a program tangibly embodying the method of Claim 3; therefore see the explanation of Claim 3. Hazma discloses a system in **(Fig 5 and at Col 1 Lines 6-10)**. Cham also discloses a program for object tracking in **(Fig 2)**.

22. Claim 15 is a program tangibly embodying the method of Claim 4; therefore see the explanation of Claim 4. Hazma discloses a system in **(Fig 5 and at Col 1 Lines 6-10)**. Cham also discloses a program for object tracking in **(Fig 2)**.

23. Claim 16 is a program tangibly embodying the method of Claim 5; therefore see the explanation of Claim 5. Hazma discloses a system in **(Fig 5 and at Col 1 Lines 6-10)**. Cham also discloses a program for object tracking in **(Fig 2)**.

24. Claim 17 is a program tangibly embodying the method of Claim 6; therefore see the explanation of Claim 6. Hazma discloses a system in **(Fig 5 and at Col 1**

Lines 6-10). Cham also discloses a program for object tracking in **(Fig 2)**.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayesh A. Patel whose telephone number is 571-270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jayesh Patel
04/12/07
JP

JINGGE WU
SUPERVISORY PATENT EXAMINER